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are near the flagellate source of the Sporozoa, and from thence as a main stem arise the Trypanosomes, Coccidians, Gregarines, Haemogregarines. He feels also that the Euglenids may give rise to lines leading to Cystoflagellates and Ciliates.

#### AN AMEBA WITH TENTACLES

Collin (Arch. Zool. Exp. N. & R., No. 4, 1912) describes a new protozoan combining the characters of Ameba and the Suctoria. The organism has a gelatinous covering whose form is easily changed, and possesses tentacles by which it attaches itself to objects. It has the nuclear and pseudopodial structure of the Ameba. It is a marine form occurring in a culture of seaweed along with other amebæ and Foraminifera.

#### SOME AMERICAN RHIZOPODS AND HELIOZOA

Wailes (Jour. Linn. Soc. Dec. 17, 1913) reports 161 species and varieties of Rhizopods and 4 species of Heliozoa from collections made in 1911 at Augusta, Georgia, in New Jersey, and at various points in New York. Comment is made upon the small amount of work done on the American species of these groups since the time of Leidy.

Of these, 5 species and 10 varieties are new. Forty of them are recorded for the first time from the United States. About 80% of the species are similar to those found in Europe. The remainder are made of species rarely or not at all found in Europe. The author states that considerable local variation exists in some of the species.

#### SIZE OF CHROMOSOMES AND PHYLOGENY

Meek (Jour. Linn. Soc. Sept. 24, 1912), thru a study of the diameters of chromosomes, has reached the conclusion that there are three diameters of chromosomes found in animals,—.21 $\mu$  in Protozoa, .42 $\mu$  in low Metazoa, and .83 $\mu$  in high Metazoa. He holds that these measurements are remarkably constant. This arithmetic progression is believed by him to mean a lateral fusion of these chromatic elements in phylogeny.

In respect to length, the author finds, by study of spermatogen-

esis in several species of *Stenobothrus* that the chromosomes of the spermatocytes are made up of rods, sometimes 2 and sometimes 4. The length of these rods varies in arithmetic progression. In each of 4 species studied there are 5 short chromosomes, no two of which are the same length; altho the 5 short chromosomes in one species correspond with the 5 short ones of the others. There are also 3 larger chromosomes in each species, but these long chromosomes do not belong in the different species to the same numerical series. The author believes that the external specific differences between the species are dependent on the differences in the long chromosomes, altho he is unable to establish the correlation between the rod-lengths and the body characteristics.

#### SPERMATOGENESIS IN HYBRID PIGEONS

Smith (Quart. J. Mic. Sci. 1912, p. 159) reports studies of the sperm formation and structure in the hybrids formed by mating a male pigeon and female domestic dove, and compares these with the condition in pure breeds.

In the first maturation division in the hybrids the chromosomes do not unite to form 8 bivalent chromosomes but occur quite irregularly about the spindle and are finally distributed to the poles irregularly.

The second maturation division is practically suppressed. The secondary spermatocytes proceed at once to form spermatids and spermatozoa. Many of these are on the average twice the normal size, altho otherwise apparently normal structurally. In other cases there were structural abnormalities.

It is known experimentally that hybrids of these stocks are infertile, and it seems that the sterility may be due to the inability of the specifically different chromosomes to unite in the normal synapse, with the consequent disturbance in the whole maturation process.

#### MALE GERM CELLS IN NOTONECTA

Browne (Jour. Exp. Zool. Jan. 1913) discusses the differences in form and number of the chromosomes in three species of *Notonecta*. She finds that the differences in the chromosome condition may be explained in these species by the relations of two particular